16082 - A new enigmatic population of over-luminous globular clusters in an ultra-diffuse galaxy

Cycle: 27, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) MATLAS2019	ACS/WFC	1	12-Mar-2020 15:00:22.0	yes

1 Total Orbits Used

ABSTRACT

As part of a systematic survey with MegaCam/CFHT, we have identified an ultra-diffuse galaxy (UDG) with an excess of globular cluster (GC) candidates in the galaxy grop NGC 5846, dubbed MATLAS-2019. A large fraction of the GCs have been confirmed with follow-up MUSE spectroscopy, all of which are over-luminous with a luminosity one magnitude brighter than what is expected from the GC luminosity function. Many of the properties of MATLAS-2019 - e.g., the number of GCs, the brightness of the GC population, and an apparent lack of dark matter - are similar to the heavily discussed UDGs NGC1052-DF2 and NGC1052-DF4. The controversial nature of these two galaxies is due, in part, to uncertainties in their distances and the fact that they reside in the same field; the confirmation of a similar object in an independent group with an unambiguous distance will bring much desired and needed additional data to the discussion. We propose follow-up of MATLAS-2019 with HST, employing two-band ACS imaging to trace the full population of GCs three magnitudes below the peak of the GC luminosity function. The HST observation, combining depth, color-information, and its superior image quality, will give us an accurate estimate of the total number of GCs. With that we can test whether the UDG hosts an exceptionally large number of GCs, but with a regular GC function, or it contains a population consisting of only over-luminous GCs. Both cases pose a conundrum for our understanding of GC and galaxy formation.

OBSERVING DESCRIPTION

F606W/F814W imaging of a single ultra-diffuse galaxy. Limited to 4 exposures of equal length for the single orbit requested/allocated. Use of small DITHER LINE as we do not require filling in the chip gap, but we do need two exposures in each filter to facilitate CR and hot pixel removal. We have created a dither of 7.5 pixels x 6.5 pixels, or spacing 0.504" at an angle of 42.11 degrees.

Data to be used to obtain magnitudes and colors of most (marginally-resolved) globular cluster candidates in this galaxy.

We have cntered the galaxy on aperture WFC1 in order to avoid chip gap running through galaxy. We have a wide range of possible ORIENT values, chosen only to to avoid a very brgiht (V=13) star to the NE of the target galaxy, and also to avoid a pair of V=15-16 stars SE and SW of the target galaxy. All are far from the galaxy, but we are maximizing the amount of the FOV available for background corrections. Relaxing the roll angles to allow the V=15-16 stars will not change the schedulability very much.

Reduced Gyro mode: We do not expect large complication if less than 3 gyros are available for the observations, reducing the effective time available

for observations. Our program allows for manyu possible roll angles, which means there are many months of schedulability available.

Visit

Proposal 16082, Visit 01 Thu Mar 12 19:00:22 GMT 2020

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: ORIENT 283D TO 354 D; ORIENT 242D TO 263 D; ORIENT 102D TO 218 D

Comments: 2xF606W + 2xF814W images of target galaxy. Center galaxy on WFC1 to be sure no GC candidates fall outside FOV, or on chip gap.

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.504 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=42.11 Angle Between Sides= Center Pattern=false		(1), (2)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	MATLAS2019	RA: 15 05 20.1600 (226.3340000d) Dec: +01 48 45.29 (1.81258d) Equinox: J2000		V=17+/-0.3	Reference Frame: ICRS

Comments:
Category=GALAXY
Description=[DWARF ELLIPTICAL]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) MATLAS2019	ACS/WFC, ACCUM, WFC1	F606W			Pattern 1, Exps 1-1 in Visit 01 (1)	515 Secs (1030 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[1]*
2		(1) MATLAS2019	ACS/WFC, ACCUM, WFC1	F814W			Pattern 1, Exps 2-2 in Visit 01 (1)	515 Secs (1030 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[1]*

Orbit Structure